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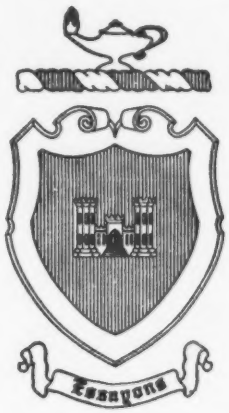
# STUDENT PAMPHLET

# GLOSSARY OF ELECTRICAL TERMS

## BASIC

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# GLOSSARY OF TERMS

The following list of definitions contains terms commonly used in the Electrical Field:

A - Abbreviation for ampere.

ABSOLUTE VALUE - The value of a number without regard to sign.

AC - Abbreviation for alternating current.

AC - DC - Term applied to electrical equipment indicating it is capable of operation from either an alternating current or direct current power source.

ADJUSTABLE RESISTOR - A resistor which can be varied mechanically.

ALLOY - A mixture of two (2) or more metals.

ALNICO - Alloy of iron with aluminum, nickle, and cobalt used to make permanent magnets.

ALTERNATING CURRENT - A current that is constantly changing in magnitude and periodically changing in direction.

ALTERNATOR - A rotating machine which produces an alternating voltage and current.

AMMETER - An instrument for measuring the amount of current flowing in a circuit.

AMPERE - The unit of measurement for current (1 coulomb/sec or $6.28 \times 10^{18}$ electrons past a given point in one sec.).

AMPERE HOUR - A measure of battery life. The product of a given current and the length of time the battery can supply this current.

AMPERE TURN - A unit of magneto-motive force obtained by multiplying the current in amperes by the number of turns in a coil.

AMPLIFIER - A device using vacuum tubes or semiconductors used to increase very small voltages, usually at high frequencies.

AMPLITUDE - Term used to describe the magnitude of a sine wave. It is the largest value measured from zero.

ANGLE OF LAG OR LEAD - Phase angle by which quantities such as current and voltage may follow one another.

ANODE - The electrode of an electron tube which acts as collector of electrons. (Also called a plate.)

APPARENT POWER - The product of voltage and current applied to a circuit having capacitance or inductance. It includes the actual power used and the power returned to the source.

ARC - An intense luminous discharge formed by the passage of electric current across a space between electrodes or conductors.

ARMATURE - The windings of a generator from which the output current is taken. It may be either moving (rotor) or stationary (stator).

ARMATURE REACTION - A distortion in the magnetic field of a DC motor or generator caused by current flow in the armature.

ATOM - The smallest particle of matter that can exist and still retain its original identity as an element.

AUTOMATIC - A term meaning a device or system which controls its own output without human attention.

AUTOTRANSFORMER - Transformer of single coil construction where the primary and secondary connections are made to the single coil.

BALANCED LOAD - A three-phase load which draws equal currents from each phase.

BASE - The part of a transistor which acts as a valve and controls the flow of current.

BATTERY - One or more cells connected to serve as a source of direct current.

BATTERY ACID - A solution used as an electrolyte in a storage battery, usually diluted sulfuric acid.

BATTERY CHARGER - A rectifier circuit used specifically for charging storage batteries.

BIAS - The application of a voltage to a circuit or component, usually a control voltage.

BRANCH CIRCUIT - A circuit which provides an additional path for current flow.

BREAK-DOWN VOLTAGE - The voltage at which the insulation between two conductors or components will break down and permit current flow.

BRIDGE RECTIFIER - Four half-wave rectifying elements are connected in the form of a diamond to obtain full-wave rectification. The AC voltage is applied to two diagonal corners. The DC output is taken from the remaining two corners.

BRUSH - A metal or carbon block used to make contact with the commutator or sliprings in a rotating machine.

BRUSHLESS GENERATOR - A synchronous generator using a rotating exciter whose rectified output is supplied directly to the main field, eliminating brushes, commutator, and sliprings.

BUS - Term used to specify an uninsulated conductor (bar or wire).

C - The letter which is used to mean capacitance.

CABLE - A group of insulated wires inside a protective covering.

CALIBRATION - A method of comparing an instrument, device or dial with a standard to determine its accuracy.

CAPACITANCE - That property of circuits which tends to oppose a change in voltage.

CAPACITIVE REACTANCE - The opposition to current flow due to capacitance, measured in Ohms.

CAPACITOR - A device which restricts the flow of AC current in a circuit because of capacitive reactance caused by the time required to change the capacitor plates. It does not allow any DC current to pass, and stores electrical energy.

CAPACITOR-START MOTOR - An induction motor having an auxiliary starting winding in series with a large capacitance.

CATHODE - The electrode of an electron tube which is heated to release electrons.

CATHODE RAY TUBE (CRT) - A large vacuum tube having a phosphor screen used in television sets and oscilloscopes to display signals.

CCW - Counterclockwise rotation.

CW - Clockwise rotation.

CELL - A DC source made of one positive electrode, one negative electrode and an electrolyte.



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CENTRIFUGAL SWITCH - A switch found on a motor shaft which is operated by the force created on it by spinning around and which usually cuts out starting windings or starting resistance.

CHARGE - A quantity of electrons stored on the plates of a capacitor.

CHARGING - The process of passing current through a capacitor or battery until the voltage developed is equal to the applied voltage.

CHEMICAL RECTIFIER - A term describing all metallic and semiconductor rectifiers.

CHOKE COIL - A coil used to limit the flow of alternating current while allowing direct current to pass.

CIRCUIT - A path or group of interconnected paths through which an electric current can flow.

CIRCUIT BREAKER - A switch which is opened automatically when the current exceeds or falls below a predetermined value.

CIRCULAR MIL - A measure of wire size. It is equal to $(1000 \times \text{wire diameter})^2$ or $(\text{wire diameter in mils})^2$.

COLD CATHODE - A source of electrons used primarily in gas tubes. It is an unheated cathode from which electrons are drawn by the positive voltage on the plate.

COIL - A number of turns of wire.

COLLECTOR - 1. The part of a transistor which receives electrons or holes. It is similar in operation to a vacuum tube plate. 2. Another term for slipring.

COMMUTATION - Mechanical rectification of generated AC.

COMMUTATOR - A device made of parallel metal segments used on the shaft of a rotating DC machine used to transfer energy to or from the rotor.

COMPOUND - A chemical combination of two or more elements such as water (hydrogen and oxygen).

COMPOUND GENERATOR - A DC generator having part of the stator winding in series with the rotor winding and part across the output terminals.

COMPOUND MOTOR - A DC motor having part of the stator winding in series with the rotor winding and part across the input terminals.

CONDENSER - This term no longer used. (See Capacitance)

CONDUCTANCE - The measure of the ability of a wire or component to conduct current. The unit of measurement of conductance is the MHO.

CONDUCTOR - A metal which contains a large number of free electrons, and through which current will flow easily.

CONTACTS - Terminals in a switch or relay which are moved to make or break an electrical connection.

CONTINUITY CHECK - A test with an Ohmmeter to make sure that there is an unbroken path for DC current flow between any two points in a circuit.

CONTROL GRID - The element of a vacuum tube triode used to vary the electron stream in the same manner as a water valve controls water flow.

COPPER - 1. The most commonly used electrical conductor.
2. A type of soldering iron which must be externally heated.

COPPER-OXIDE RECTIFIER - A rectifier made of copper discs coated on one side with copper oxide.

CORE - The center of a coil or transformer normally air or iron.

COULOMB - The unit of measure of an electric charge (One coulomb is equal to $6.28 \times 10^{18}$ electrons).

COUNTER EMF - An induced EMF in a conductor or coil that is $180^{o}$ out of phase with the applied EMF.

CPS - Abbreviation for "cycle per second".

CURRENT - The flow of free electrons from atom to atom in a particular direction. It is measured in amperes.

CURRENT TRANSFORMER - A transformer designed to step down high currents for easy measurement.

CYCLE - One complete alternation of an alternating current.

DC - Abbreviation for direct current.

DELTA - A type of circuit connection where three components or AC sources are connected in shape of a triangle.

DENOMINATOR - The part of a fraction below the line.

DIELECTRIC - The insulating material between the two plates of a capacitor.

DIELECTRIC CONSTANT - The insulating quality of a given substance as compared to air.

DIELECTRIC STRENGTH - The maximum voltage that a dielectric can withstand without breakdown.

DIODE - A semiconductor or electron tube containing two electrodes used to change AC to pulsating DC. It will pass current in one direction only.

DIRECT CURRENT - An electrical circuit that flows in only one direction and has a constant magnitude.

DIRECT HEATED CATHODE - A filament type cathode that carries its own heating current.

DISCHARGING - The process of permitting current to flow out of a battery or capacitor.

DISTRIBUTED WINDING - Overlapping coils placed in slots in the rotor and stator of an AC machine so that there are no definite pole locations such as a salient pole machine would have.

DIVIDEND - The number to be divided by another.

DIVISOR - The number by which another is divided.

DPDT SWITCH - Double pole, double throw switch.

DPST SWITCH - Double pole, single throw switch.

DRY CELL - A type of primary cell in which the electrolyte is in the form of a paste.

DYNAMO - A machine for converting mechanical energy into electrical energy. (Usually called a generator.)

E - The letter symbol for voltage.

EDDY CURRENT - A circulating current induced in conducting materials such as iron cores by varying magnetic fields. It causes an energy loss by creating heat.

EDISON EFFECT - The emission of electrons from a heated electrode, also referred to as thermonic emission.

EFFECTIVE CURRENT - The value of alternating current which will cause the same heat effect as a given value of direct current. ($I_{eff} = 0.707\ I_{max}$)

EFFICIENCY - The ratio of energy output to energy input - usually expressed as a percentage.

ELECTRIC FIELD - An effect in space which causes a force on a charged particle.

ELECTRICITY - A natural occurence resulting from the motion of electrons due to heating, induction or chemical action.

ELECTROLYTE - The liquid or chemical paste used between the electrodes of a storage cell or dry cell.

ELECTROLYTE CAPACITOR - A high-capacity polarized capacitor which uses a paste dielectric and which must be connected according to the polarity markings on the case.

ELECTROMAGNET - A coil of wire usually wound on an iron core which produces a magnetic field when a current is sent through the coil.

ELECTROMOTIVE FORCE (EMF) - The force which causes the electrons within a conductor to move. (Also called voltage or potential difference.)

ELECTRON - A particle which has the smallest known amount of negative charge and which is found in the orbits of atoms.

ELECTRON EMISSION - The ejection of electrons from the surface of a material into surrounding space.

ELECTRON TUBE - See vacuum tube.

ELECTROSTATIC CHARGE - An electric charge stored in a capacitor or on the surface of an insulated object.

ELEMENT - One of the types of matter such as oxygen or carbon materials having different characteristics. Also used to describe a part of the structure of a vacuum tube.

EMITTER - The part of a transistor which supplies electrons or holes.

END BELLS - The metal end pieces of a motor or generator which hold the rotor in place.

ERROR SIGNALS - A voltage proportional to the difference between the desired output of a system and the actual output.

F - The letter symbol for frequency.

FARAD - The unit of measurement of capacitance.

FEEDBACK - A process by which a machine or system can correct changes in its output.

FIELD - The effect produced in surrounding space by an electrically charged object or by a magnet.

FILAMENT - The wire through which current flows in a vacuum tube to produce the heat required for electron emission.

FILTER - A resistor, coil, capacitor or any combination of components which is used to block or reduce alternating current at certain frequencies. It is usually used to change pulsating DC to smooth DC.

FLOATING NEUTRAL - 1. The non-existing neutral point of a Delta-connected three phase system.
2. A neutral point of a Wye-connected system which is not grounded or connected to some other point.

FLUX - 1. A term used to indicate magnetic or electrical lines of force.
2. A substance used to prevent oxide formation during soldering.

FLUX LINKAGE - Magnetic lines of force which link a coil of wire.

FORWARD VOLTAGE - A voltage having a polarity which will cause current to flow in a diode when applied to the diode.

FREE ELECTRONS - Electrons in the outer orbits of certain atoms which are so loosely held that they can be made to travel between atoms by the application of heat or potential difference.

FREQUENCY - The number of complete cycles per second.

FREQUENCY METER - A meter used to indicate the output frequency of a generator or other sources.

FULL-WAVE RECTIFIER - A device which rectifies an alternating current in such a way that both halves of the AC cycle appear in the pulsating DC output.

FUSE - A circuit-opening device having a wire which melts when too much current is passed through it.

GENERATOR - A rotating machine which produces electricity, usually DC.

GERMANIUM - A type of semiconductor material.

GOVERNOR - A device for controlling the speed of an engine.

GRAPH - A sketch drawn according to points indicated on horizontal and vertical lines. It is used to pictorially show a mathematical equation.

GROUND - A connection, internal or accidental, between an electric circuit and the earth or some conducting body or chassis serving in place of the earth.

HALF-WAVE RECTIFIER - A device which converts alternating current into pulsating direct current by allowing current to pass only during one half of each AC Cycle.

HEATER - An electric heating element for supplying heat to an indirectly heated cathode in an electron tube.

HENRY - The unit of self-inductance or mutual-inductance. The inductance at which a current change of one ampere per second induces an electromotive force of one volt.

HOLES - The name given to the spaces in the atomic structure of semiconductor material due to a lack of electrons. The movement of holes can be considered as a current in the same manner as electron movement.

HORSEPOWER - A unit of measurement of electrical or mechanical power. One horsepower is equal to 746 watts.

HYSTERESIS - An energy loss in magnetic materials due to changing magnetic field. The loss appears in the form of heat.

HYDRAULIC - Refers to equipment operated by fluid pressure.

I - Letter symbol for current.

IGNITION - Causing a fuel-air mixture to burn by applying an electric arc.

IMPEDANCE - The total opposition to the flow of current in an AC circuit.

INDUCED VOLTAGE - A voltage produced in a circuit by changes in the number of magnetic lines of force which are linking or cutting across the conductors of the circuit.

INDUCTANCE - That property of an AC circuit which tends to oppose a change in current.

INDUCTION MOTOR - An AC motor having a rotating magnetic field in the stator and usually a squirrel-cage rotor. It operates at a nearly constant speed which is less than synchronous speed. If single-phase, it is not self-starting.

INDUCTIVE REACTANCE - Opposition to current flow due to the inductance of a coil, measured in ohms.

INDUCTOR - A device which reduces the flow of AC current in a circuit because of inductive reactance caused

by magnetic flux linkage. It does not reduce DC current.

IN PHASE - The condition existing when sine waves pass through their maximum values of like polarity at the same instant.

INPUT - The terminals to which the incoming voltage is applied.

INSULATOR - A material containing few free electrons.

ION - An atom or molecule which has fewer or more electrons than normal.

IR DROP - The voltage drop produced across a resistance by the flow of current through the resistor (E = I xR).

JUNCTION - A point in a circuit where two or more wires are connected. Also, the connection of N-type and P-type semiconductor material as in a junction diode.

KILO - Metric prefix meaning 1000.

KILO VOLT - One thousand (1000) volts.

KILO WATT - One thousand (1000) watts.

KIRCHOFF'S CURRENT LAW - The sum of all the currents flowing to a point in a circuit must equal to the sum of all the currents flowing away from that point.

KIRCHOFF'S VOLTAGE LAW - The sum of all the voltage sources acting in a complete circuit be equal to the sum of all the voltage drops in that circuit.

KVA - Kilovolt Ampere.

L - The letter which is used to mean inductance.

LAG & LEAD - The relationship between voltage and current in a circuit. If there is inductance in the

circuit the current lags the voltage. If there is capacitance in the circuit the current leads the voltage.

LAMINATED - The building up of the desired shape of the core with thin strips of a permeable material such as soft iron or silicon steel.

LAW OF ELECTRIC CHARGES - Like charges repel and unlike charges attract.

LAW OF MAGNETISM - Like poles repel and unlike poles attract.

LEAD - 1. A term used to describe a connecting wire between components or multimeter probe.
2. A heavy, soft metal with a low melting point mixed with tin to form solder.

LEAKAGE FLUX - Magnetic lines of force that do not encircle all the turns in a transformer or coil, and so do not contribute to inductance or to the transfer of energy from one coil to another.

LEFT HAND RULE - Grasp wire with the thumb of the left hand pointing in the direction of electron flow. The magnetic lines of flux are flowing in the direction the fingers are pointing.

LENZ' LAW - The direction of the induced current is always such that its magnetic field opposes the motion which produced it.

LINE DROP - The voltage drop between two points on a power line or transmission line, due to the resistance of the line.

LINE VOLTAGE - The voltage existing at a wall outlet or other terminals of a power line system.

LINES OF FORCE - Lines used to indicate the direction and strength of a magnetic or electric field the lines leave north poles and positive electric charges and enter south poles and negative charges.

LOAD - An electrical load is any device or circuit component which draws current from a source. The more current drawn, the greater the load.

LOAD TRANSFER - As applied to generators, this means adjusting the speed of generators in parallel until the load is equally shared.

MA - Abbreviation for milliampere.

MAGNET - A body which attracts iron and steel, and if free to move, sets itself in a definite direction due to the influence of the earth's magnetic field.

MAGNETIC AMPLIFIER - A tubeless, sensitive amplifier, in which large output current changes can be controlled by the introduction of a small voltage change across a control field.

MAGNETIC CIRCUIT - A closed path for magnetic flux.

MAGNETIC FIELD - A region in space surrounding a magnet or a conductor through which current is flowing.

MAGNETIC FLUX - The sum of all the magnetic lines of force from a magnetic source.

MAGNETIC FLUX DENSITY - The number of lines of force per unit area.

MAGNETIC LINES OF FORCE - Imaginary lines used for convenience to designate the directions in which forces are acting throughout the magnetic field associated with a permanent magnet, an electromagnet, or a current carrying conductor.

MAGNETIC POLES - Regions in a magnet where the field is concentrated. Usually the two ends of a magnet; one a north pole, one a south pole.

MAGNETITE - An oxide of iron, strongly attracted by a magnet. Magnetite is sometimes polarized; it is then called lodestone.

MAGNETO - A permanent magnet AC generator used to produce current for the ignition system of a gasoline engine. It is driven by the engine itself.

MAGNETOMOTIVE FORCE - Magnetic potential difference (expressed in gilberts).

MAGNITUDE - The size or numerical value of a wave form, graph or number.

MANUAL - 1. Something to be done by hand.
2. A Technical Handbook.

MECHANICAL RECTIFIER - A device which changes AC to pulsating DC by mechanical action such as a commutator.

MEGA - A prefix meaning one million. ($1 \times 10^{6}$)

METALLIC RECTIFIER - A term describing rectifiers made from metal or metal oxides such as selenium or copper oxide rectifiers.

mfd - Abbreviation for microfarad ($1 \times 10^{-6}$ Farad).

MICRO - A prefix meaning one-millionth ($1 \times 10^{-6}$).

MIL - 1. An expression for 1/1000 inch.
2. Occasionally used to express 1 milliampere.

MILLI - A prefix meaning one-thousandth ($1 \times 10^{-3}$).

mmf - Abbreviation for micromicrofarad ($1 \times 10^{-12}$ Farad).

MOLECULE - The smallest part into which a compoune can be divided and still have its original characteristics.

MOTOR - A machine that converts electrical energy into mechanical energy.

MULTIMETER - A test instrument having a number of different ranges.

N-TYPE - Semiconductor material having an excess of electrons.

NEGATIVE - The electrical charge corresponding to that charge of an electron.

NEGATIVE CHARGE - A condition of having excess electrons.

NEUTRAL - 1. Having no charge or polarity.
2. The point in a three phase system to which one end of each phase is connected. (See Wye connection.)

NEUTRAL PLANE - The position of brushes in a DC motor or generator which causes the least amount of sparking. It is the point at which there is zero EMF between commutator bars.

NEUTRON - A particle, found in the nucleus of an atom, which has a neutral charge and a mass equal to that of the proton.

NPN - A type of transistor in which the base is P-Type material and the collector and emitter are N-Type.

NUCLEUS - The central part of an atom, consisting of protons and neutrons.

OHM - The unit of electrical resistance.

OHMMETER - An instrument for measuring resistance.

OHM'S LAW - States that the current is directly proportional to the voltage and inversely proportional to the resistance ($I = E/R$).

POTENTIOMETER - A type of variable resistor having three terminals.

POWER - Rate of doing work. ($P = I \times E$)

POWER FACTOR - A measure of electrical efficiency defined as the ratio of the true power in watts to the apparent power in volt-amperes.

PRACTICAL DIAGRAM - A diagram which combines symbols and scale drawings to show circuit connections.

PRIMARY - The transformer winding which receives the energy from a supply circuit. Also called the input.

PRIMARY BATTERY - A battery of one or more primary cells.

PRIMARY CELL - A type of cell in which the generated voltage is due to permenent chemical changes in the cell material. A primary cell is not normally recharged.

PRIMARY VOLTAGE - The voltage applied to the input terminals of a transformer.

PROTON - A particle found in the nucleus having a charge of plus one and a mass of one in atomic units. It is 1845 times heavier than an electron.

PULSATING DIRECT CURRENT - A direct current with a changing magnitude.

Q - The abbreviation for a quantity of electric charge. (Measured in coulombs.)

R - The abbreviation for resistance.

REACTANCE - Opposition offered to the flow of an alternating current by inductance.

REACTANCE - Opposition offered to the flow of an alternating current by inductance.

RECEPTACLE - A means of connecting a wire or cable to a piece of equipment.

RECTIFICATION - The process of changing alternating current into direct current.

RECTIFIER - The circuit component which changes alternating current into pulsating direct current.

REGULATION - The process of maintaining a constant output.

REGULATOR - A control system in which the output is kept as constant as possible.

RELAY - An electromagnetic switch employing an armature to open or close contacts. A small current through the coil actuating the armature controls a heavy duty circuit.

RELAY CONTACTS - Contacts attached to or activated by the movement of the armature of a relay.

OVERLOAD - An electrical load placed on a circuit or item of equipment which causes failure of operation.

P - The letter which is used to mean power.

PARALLELING - As applied to electrical generators this means to divide an electrical load between two or more generators.

$\pi$ - The Greek letter which is used to mean the constant 3.14.

P-TYPE - Semiconductor material having a lock of electrons.

PEAK - the maximum instantaneous value of a varying quantity.

PERMEABILITY - The measure of the ease with which a given material can carry magnetic lines of force.

PHASE - The position at any instant which a periodic wave occupies in its cycle. Also the difference (in electrical degrees) between the maximum of two waves.

PICTORIAL DIAGRAM - A diagram which shows the method of connection of components in a circuit and physical location by the use of scale drawings of each item.

PLATE - Another name for the positive anode of an electron tube.

PNP - A type of transistor in which the base is N-type and the collector and emitter are P-type.

POINTER - The needle-shaped rod that moves over the scales of a meter.

POLARITY - 1. An electrical condition determining the direction in which current tends to flow.
2. The quality of having two opposite charges, one positive and the other negative.
3. The quality of having two opposite magnetic poles, one north and one south.

POLE - One end of a magnet. One electrode of a battery.

POSITIVE - A term used to describe a terminal having fewer electrons than normal, so that it attracts electrons in seeking to return to its normal state. Thus electrons flow into the positive terminal of a voltage source.

POTENTIAL - Voltage.

POTENTIAL DIFFERENCE - The difference in voltage between two points. Also called electromotive force.

RELAY MAGNET - A coil and iron core forming the electromagnet that attracts the armature of a relay when energized.

RELUCTANCE - A measure of the force exerted against magnetic flux which permeates a material.

REPULSION MOTOR - An AC motor usually having a wound rotor, commutator, and short-circuited brushes. Motor speed is controlled by the position of the brushes. It has a high starting torque.

RESIDUAL MAGNETISM - The magnetic force remaining in a ferro-magnetic object after the magnetizing force is removed.

RESISTANCE - The non-reactive opposition which a device or material offers to the flow of direct or alternating current. The opposition results in production of heat in the material carrying the current. Resistance is measured in ohms and is usually designated by the letter "R".

RESISTOR - A device which restricts the flow of AC or DC current in a circuit because of its construction and the material from which it is made.

RESONANCE - The effect in an RLC circuit which occurs when the inductive and capacitive reactances are equal and opposite and the current is determined by the resistance only.

REVERSE VOLTAGE - A voltage having a polarity which will prevent current from flowing in a diode when applied to the diode.

RHEOSTAT - A type of variable resistor having two terminals.

RIPPLE - The variations remaining in a DC voltage which has been rectified but not filtered enough.

RMS - The abbreviation for Root-Mean-Square which represents the effective value of an AC Voltage or current.

ROSIN - The most common electrical flux.

ROTATING FIELD - An electric field set up by AC current in a motor winding which behaves as though the magnetic poles formed were moving around the winding.

ROTATING MACHINE - A general term used to describe any motor or generator.

ROTOR - The rotating part of an electric motor or generator.

RUNNING TIME METER (RTM) - A meter used to indicate the length of time an item of equipment has operated. Also called an hour meter.

SALIENT POLE - An iron core with a concentrated winding wrapped around it used in pairs as magnetic poles in a motor or generator.

SATURABLE REACTOR - An iron core inductor having an additional DC winding. The AC impedance of the inductor can be controlled by the amount of current in the DC winding.

SATURATION - The condition found in an iron core when increasing the magnetizing force applied to the iron does not make the magnetic field any stronger.

SCHEMATIC DIAGRAM - A diagram which shows the method of connection of components in a circuit by the use of symbols.

SECONDARY CELL - A type of cell in which the chemical changes which generate voltage can be reversed and the cell recharged. It consists of two dissimilar electrodes in a conducting fluid (electrolyte).

SELENIUM RECTIFIER - A dry disc rectifier made of a crystalline selenium layer between two electrodes. Also called chemical rectifier.

SEMICONDUCTOR - A device made of a poor conductor which can be used to control acurrent as in a transistor or rectify as in a diode.

SERIES - A way of arranging parts in a circuit by connecting them end to end to provide a single path for current flow.

SERIES MOTOR - A motor (AC - Type, DC - Type, Universal) which has the stator field windings in series with the rotor windings. The speed depends on the load. It is dangerous to operate a series motor with no load because of the high speed at which it would run.

SERVO - A control system in which the output is varied according to the inputs.

SHADED-POLE MOTOR - An AC motor having heavy copper rings around part of each pole. The magnetic field through each ring lags behind the rest of the field, causing the effect of a rotating field.

SHUNT - Any part connected in parallel with some other component.

SHUNT GENERATOR - A DC generator having the stator winding in parallel with the rotor winding.

SHUNT MOTOR - A DC motor having the stator winding in parallel with the rotor winding.

SHORT CIRCUIT - A direct low resistance connection across a voltage.

SILICON - A type of semiconductor material.

SINE WAVE - A graphical representation of one cycle of alternating current.

SINGLE PHASE - Describes an electrical system or device using one alternating voltage of a constant frequency.

SLIP - In an induction motor, slip is the difference between the speed of the rotating magnetic field and the actual rotor speed. It is expressed as a percentage of synchronous speed.

SLIP - Refers to the difference between the synchronous speed of a rotating field in an induction motor and the actual speed of the rotor. It is expressed as a percentage of the synchronous.

SLIP RINGS - Metal rings attached to the shaft of an AC rotating machine. They are used to transfer energy to or from the rotor windings by the use of brushes.

SOLDER - An alloy of lead and tin having a low melting point. It is used for making good electrical connections.

SOLENOID - A coil having a core which will move and do work when current flows through the coil.

SPACE CURRENT - The current made up of electrodes moving from the cathode to the plate and other positive electrodes in a thermonic vacuum tube.

SPARK PLUG - A device for causing the ignition of fuel-air mixtures.

SPDT SWITCH - Single pole, double throw switch.

SPECIFIC GRAVITY - The ratio of the weight if a substance to the weight of an equal volume of water.

SPLIT-PHASE MOTOR - An AC induction motor having a high resistance auxiliary starting winding 90 electrical degrees away from the main winding.

SPST SWITCH - Single pole, single throw switch.

SQUARE - The square of a number is the product of the number multiplied by itself.

SQUARE ROOT - The square root of a number is another number which, when multiplied by itself, will produce the original number.

SQUIRREL CAGE ROTOR - A laminated iron rotor with aluminum or copper bars placed in the iron parallel to the shaft. The bar ends are short-circuited together.

STATIC CHARGE - The electric charge accumulated on an object, usually by friction. Also called static electricity.

STATIC EXCITER - A device for providing field current when starting a generator.

STATOR - The non-moving part of a rotating machine.

STEP-DOWN TRANSFORMER - A transformer designed for reducing the voltage while increasing the available current.

STEP-UP TRANSFORMER - A transformer designed for increasing the voltage while reducing the available current.

SWITCH - A mechanical device for completing or interrupting an electric circuit.

SYNCHRONIZING - Adjusting two or more devices so that they operate exactly alike.

SYNCHRONOUS GENERATOR - A synchronous machine which is driven at constant speed by an engine, and which is used for voltage generating.

SYNCHRONOUS MOTOR - A constant-speed AC motor having a rotating stator field and a DC rotor field. It is designed so that the rotor turns at the same speed as the rotating field.

SYNCHRONOUS SPEED - The speed of the rotating magnetic field in the windings of an AC motor. It is expressed by $n = \frac{120F}{P}$, where f is the line frequency, and P is the number of Poles, and n is the synchronus speed.

THERMIONIC EMISSION - The emitting of electrons from a heated surface.

THERMISTOR - A resistor whose resistance varies with temperature. It is used to measure or compensate for temperature.

THREE PHASE - An electrical system using three AC voltages of the same frequency but $120^{\circ}$ apart in time.

TRANSFORMER - An electrical device, without moving parts, that transfers electrical energy by magnetic induction from one or more circuits to one or more other circuits.

TRANSISTOR - A three element semiconductor used in the same manner as a vacuum tube triode. It consists of a collector, base and emitter which operate in the same manner as a plate, control grid and cathode.

TRIODE - A vacuum tube containing three elements: plate, cathode, and control grid.

TRUE POWER - The power used in the resistive part of a circuit creating a heating effect. It is equal to the product of the voltage and current applied to the resistive part, and is expressed in watts.

TURNS RATIO - The ratio of the number of turns in the primary to the number of turns in the secondary.

UNIVERSAL MOTOR - A series motor designed to operate on AC or DC.

V - An alternate abbreviation for voltage.

VACUUM TUBE - A glass or metal shell containing no air and a number of metal electrodes between which electrons are made to flow.

VECTOR - A line having magnitude and direction used in mathematical analysis.

VOLT - The unit of measure for voltage. One volt is the potential difference required to cause one ampere of current to flow through one ohm of resistance.

VOLTAGE - The potential difference or electrical pressure which causes electrons to flow. It is also called electromotive force (EMF).

VOLTAGE DROP - The voltage developed between the terminals of a circuit component by the flow of current through the component.

VOLTMETER - An instrument for measuring voltage.

WATT - The unit of true electrical power.

WATT-HOUR - A unit of electrical energy equal to one watt being consumed continuously for one hour.

WATTMETER - A meter used to measure electrical power.

WINDINGS - The coils found in electric motors and generators.

WYE - A type of circuit connection where three components or AC sources are connected to form the letter "Y".

$X_C$ - The symbol used to designate capacitive reactance.

$$(X_C = \frac{1}{2\pi fC})$$

$X_L$ - The symbol used to designate inductive reactance.

$$(X_L = 2\pi fL)$$

YOKE - The non-moving part of an electrical machine.

Z - The symbol used to designate impedance.

$$(Z \text{ series} = \sqrt{R^2 + (X_L - X_C)^2}$$

ZENER DIODE - A semiconductor diode designed to operate with a reverse voltage applied. During operation, the voltage across the diode remains constant, regardless of the amount of current flowing through it. It is usually used as a voltage regulator.